

We Claim

1. A system for exhausting gas via a nozzle, comprising:
a nozzle comprising a nozzle body portion defining a
5 nozzle exit, characterised in that the nozzle body portion
comprises fluid injection means, positioned upstream of the
exit relative to a fluid flow created by the operation of
the system, for injecting fluid upstream of the exit.
2. A system as claimed in claim 1 wherein the nozzle body
10 portion further defines a nozzle flow channel leading to
the nozzle exit, wherein the fluid injection means is
positioned for injecting fluid within the nozzle flow
channel.
3. A system as claimed in claim 1 wherein the nozzle has
15 an exterior surface and the fluid injection means is
positioned for injecting fluid at the exterior surface of
the nozzle upstream of the exit.
4. A system as claimed in claim 1 wherein the fluid
injection means comprises one or more apertures in the
20 outer surface or surfaces of a nozzle body for providing
one or more fluid jets.
5. A system as claimed in claim 4 wherein the aperture(s)
are positioned upstream of the exit.
6. A system as claimed in claim 4 further comprising
25 means for providing the fluid jet(s) via the aperture(s)
during operation of the system.
7. A system as claimed in claim 4 further comprising
pulsing means for pulsing the fluid jet(s).
8. A system as claimed in claim 7 wherein the pulsing
30 means pulses the fluid jet(s) at a frequency of Hz and/or
kHz.
9. A system as claimed in claim 7, wherein the pulsing
means are controllable to vary the frequency at which one
or more fluid jets are pulsed.
- 35 10. A system as claimed in claim 4, further comprising
means for altering the mass flow of the fluid jet(s).

11. A system as claimed in claim 4 wherein the mass flow rate of the fluid jet(s), when operational, is fixed.
12. A system as claimed in claim 4, wherein the apertures have a fixed position and further comprising means for 5 varying the position of fluid jets by providing fluid jets via selected apertures only.
13. A system as claimed in claim 1 wherein the fluid injection means creates microjets of fluid.
14. A system as claimed in claim 1 for use as an aeroplane 10 engine, wherein the nozzle body tapers to an edge at an exit.
15. A system as claimed in claim 1, for use as an aeroplane engine, further comprising means for controlling the injection means to inject fluid during take-off of the 15 aeroplane but not to inject fluid when cruising.
16. A method of suppressing part of the noise of a gas exhausted from a nozzle comprising a nozzle body portion defining a nozzle exit, the method comprising the step of:
 - injecting fluid into a fluid flow created by the 20 operation of the engine while the fluid flow is travelling adjacent the nozzle body portion.
17. A system for exhausting gas via a nozzle, comprising:
 - a nozzle comprising a nozzle body portion defining a nozzle exit, characterised in that the nozzle body portion 25 comprises output means, positioned upstream of the exit relative to a fluid flow created by the operation of the system, for disturbing a boundary layer between the nozzle body portion and the fluid flow.
18. A system as claimed in claim 17, wherein the output 30 means comprises fluid injection means for injecting fluid upstream of the exit or sound wave production means.
19. A system as claimed in claim 18, wherein the fluid injection means comprises a plurality of apertures for providing fluid microjets.
- 35 20. A system as claimed in claim 19, further comprising pulse means for pulsing the fluid microjets.

21. A method of suppressing part of the noise of a gas exhausted from a nozzle comprising a nozzle body portion defining a nozzle exit, the method comprising the step of:
 - disturbing a boundary layer between the nozzle body portion and a fluid flow created by the operation of the system.
22. A system for exhausting gas via a nozzle, comprising:
 - a nozzle, the nozzle comprising a nozzle body portion comprising fluid injection means for injecting fluid10 characterised in that the system further comprises control means for controlling the fluid injection means to inject fluid during a first phase of operation and to not inject fluid during a second phase of operation.
23. A system as claimed in claim 22 wherein the first 15 phase is at least a part of the take-off phase of an aeroplane flight.
24. A system as claimed in claim 22 wherein the second phase is at least a part of the cruising phase of an aeroplane plane flight.
- 20 25. Any novel subject matter or combination including novel subject matter disclosed, whether or not within the scope of or relating to the same invention as any of the preceding claims.